



Site 186 Page-Potter Marsh / Rust Island

Overview: The Page-Potter Marsh / Rust Island potential restoration site is located on Rust Island just west of the Route 128 crossing over the Annisquam River. The southern edge of the site borders the Route 128 embankment slope and the northern edge borders Ye Old County Road. The 18 in CMP culvert under the local road is in poor condition and provides little tidal exchange with the Annisquam River due to a combination of size and elevations. The site encompasses approximately 2.6 ac of emergent marsh upstream of the culvert. The site is nearly entirely a monotypic stand of tall *Phragmites* with a few very small remnant patches of high marsh vegetation. There is no creek system within the site. On 1893 USGS mapping (Gloucester, MA Quadrangle USGS 15 Minute Series), the potential restoration area is shown as a finger of salt marsh extending north from the Little River south of the site.

Ye Old County Road, which is shown on the 1893 map, provided access to an historic ferry landing across the Annisquam. The construction of Route 128, as well as a parallel local road providing access to the southeastern tip of Rust Island, fragmented the tidal connection to the Little River. Both of these roads are shown on 1944 USGS mapping (Gloucester, MA Quadrangle, USGS 7.5 Minute Series). More current USGS mapping from the 1980s, shows the restoration area as an open water pond. MassGIS color orthophotography from 1994 appears to show an entirely vegetated area, although the resolution of the image is poor. The abutting property owner stated the wetland (dominated by *Phragmites*) and culvert under Ye Old County Road have been in their current state since he first built his home in 1969 (R. McGilvray, resident, pers. comm.). The site reportedly experienced substantial siltation during the construction of the high embankment slopes along Route 128. The site currently receives little tidal exchange due the combined effects of relatively high elevations within the restricted marsh and an undersized culvert. The wetland is largely owned by the ECGA.

Structure conditions: Limited tidal flows to the potential restoration site are conveyed under Ye Old County Road via an 18 in CMP culvert. A portion of the downstream pipe has been lost due to corrosion. There is no formal riprap protection at either end of the culvert; however the rocky beach at the downstream end does provide some scour protection. Ye Old County Road in the area of the culvert is in fair condition. The downstream side of the road will shortly require some level of protection to address continued coastal erosion. There are indications that the culvert is beginning to weaken and collapse (pavement cracks, settlement, patching). The overall condition of the culvert and Ye Old County Road is poor. The existing culvert has been in place for over 35 years. The life expectancy of the 18 in CMP culvert is estimated to be less than 5 years.

Ecological Integrity: The potential restoration site has been highly modified by human activities for an extended period of time. The construction of Route 128 severed the original tidal connection south to Little River. The site reportedly experienced substantial siltation during the construction of the high embankment slopes along Route 128 and has been a *Phragmites*-dominated wetland for over 3 decades. Borings from the wetland found nearly 4 ft of fine sands over a buried peat horizon. The elevation of the buried peat horizon is substantially lower than typical marsh elevations bordering the Annisquam River due to compaction from the sandy overburden. The rocky shore habitat north of the roadway limited available biological benchmarks for unrestricted reference marsh elevations. However, the restricted marsh appears to be approximately 0.5 ft higher than elevations associated with unrestricted high marsh vegetation.

The potential restoration site is nearly entirely a monotypic stand of tall *Phragmites* with a few very small remnant patches of high marsh vegetation. The wetland occupies a well-defined topographic depression which rises abruptly to forested uplands to the east and west and the



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Route 128 embankment to the south. An overhead transmission line also passes over the southern end of the wetland. There is a single residence along Ye Old County Road which directly abuts the northwestern edge of the wetland.

The wetland area is owned by the ECGA, however, there is no on-going management. The roadway is owned by the County but maintained by the City. The site is not contained within an ACEC or mapped as listed species habitat. The area is included as supporting landscape to BioMap core habitat associated with the large salt marsh complex found north and west of Rust Island. The adjacent intertidal areas of the Annisquam River are mapped as suitable habitat for soft-shelled, razor and surf clam. The elevated invert above the creek bed restricts upstream fish passage over the lower portion of the flood tide. However, there is very limited fish habitat upstream of the berm due to the relatively high ground elevations. Based on the severely limited tidal exchange observed from past investigations by NOAA staff, no gauges were deployed for this study.

The overall severity of the existing impairments is considered severe. A reduction in the tidal restriction with the replacement of the existing culvert with a larger structure, set lower in the channel, would have limited benefits in controlling the monotypic stand of *Phragmites* due to existing ground elevations. The restoration of salt marsh would also require lowering the existing elevations by a minimum of 0.5 ft and constructing a creek system to allow for the effective circulation of tidal flow and the drainage of freshwater contributions to the system. There are no other adjacent wetlands to the marsh which could be impacted. The single residence on Ye Old County Road is also a factor in the restoration feasibility. The first floor of the structure is approximately 4 ft above the mean spring tide elevation; however the base of the existing underground waste disposal system could be impacted with higher water levels and requires closer examination. The disposal system reportedly consists of a cesspool which is failing by definition due to the fact that the system is within 50 ft of the wetland.

Socioeconomic: Recreational values of the potential restoration site are limited due to the limited access and parking. Educational opportunities are enhanced by the conservation status however there are no nearby schools. The site's Uniqueness/Heritage value is generally considered low. The area is not contained within an ACEC and does not include any known cultural resource elements or urban setting values.

Construction Logistics/Feasibility: The overall constructability for this site is medium. The limited site access, low-lying abutters, and the fact that Ye Old County Road is the only road to homes to the west of the site are all constraints. Construction of the new culvert under the road will have to be completed in stages to maintain access to the western homes. There is also an exposed "summer" waterline that runs parallel to Ye Old County Road, however temporary relocation of this line can be easily accomplished. Existing overhead utilities are not anticipated to impact construction methods.

Restoration at this site would consist of replacing the existing 18 in culvert with a larger structure placed at a lower elevation (approximately 48-60 in culvert or small box culvert), removing accumulated sediment in the upstream marsh, and constructing a creek system. The relatively low elevation of the road bed may influence available culvert options. Replacement of the existing culvert will require phasing to maintain limited access through the construction site as no detours exist. Low ground pressure equipment will be required for work on the marsh. Material removed from the site will have to either be disposed of on site (reducing restoration area), or hauled off site to a suitable disposal location.



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Ye Old County Road provides good access to the culvert. However, staging areas are very limited. The narrow winding nature of the road makes it difficult for a hauling road for excavated material. It may be possible to construct a temporary access/hauling road along the power line right-of-way off Rust Island Road. This option would provide more direct access to Route 128 with few residences along the way. The terrain of the easement appears traversable but is somewhat steep. Further investigation of this option should be explored.

The total construction cost associated with this project is estimated to be \$550,000 which is based on the on-site disposal of approximately 2,750 cubic yds which would consist of placing the excavated material against the existing highway embankment.

Restoration Potential: The site is considered to have moderate restoration potential based on the current condition of the infrastructure, severely impacted ecological integrity, limited utility concerns, and limited low-lying property issues. The site's potential is reduced by the amount of work necessary to establish appropriate marsh grades and tidal flushing, disposal issues for *Phragmites* rhizomes, construction access and staging difficulties, and the limited important socioeconomic factors associated with the site. Existing elevations above the berm are currently too high to support healthy high marsh vegetation. The amount of planning and construction work required results in relatively high project costs.

Without restoration measures, little ecological changes would be anticipated. However, work on the culvert will be required to address the poor condition. Work necessary to stabilize the roadway embankment will also require attention in the near future. Future steps leading toward project implementation should focus on more detailed elevation information on the adjacent septic system, reference marsh biological bench marks, construction access options, on-site disposal options to reduce hauling costs, and gauging the level of interest among ECGA, the adjacent land owner, and municipal officials. The ability to stockpile excavated material along the highway embankment should be investigated with MassHighway.





Photo 1 - Downstream View of Culvert



Photo 2 - Downstream View of Road Crossing





Photo 3 - Site Viewed from Road Crossing



Photo 4 - View of Abutting Property from Road





Great Marsh Coastal Wetlands Restoration Planning

Rapid Field Assessment

Site # 186

Page-Potter Marsh/Rust Island



Site Information

Site ID:

Site Name:

Municipality:

Location:

Adjacent Waterbody:

Affected Area (Acres)

Mudflat/Open Water: Total Area:

Salt Marsh:

Other Wetland: Other Description:

Other:

Impairment(s)

Tidal Restriction	<input checked="" type="checkbox"/>	Fill	<input checked="" type="checkbox"/>
Obstructed Ditch(s)	<input type="checkbox"/>	Invasive Species	<input checked="" type="checkbox"/>
Impoundment	<input type="checkbox"/>	Pollution / Siltation	<input type="checkbox"/>
Severity of Impairments	<input type="text" value="Severe"/>		

Project Type

Roadway Culvert(s)	<input checked="" type="checkbox"/>	Obstructed Ditches	<input type="checkbox"/>
Bridge	<input type="checkbox"/>	Fill	<input checked="" type="checkbox"/>
Berm	<input type="checkbox"/>	Other	<input type="text"/>

Evidence of Restriction

Gauge Data	<input type="checkbox"/>	Impounded Flow	<input type="checkbox"/>
Downstream Scour Pool	<input type="checkbox"/>	Obstructed Flow	<input checked="" type="checkbox"/>
Upstream Scour Pool	<input type="checkbox"/>	Invasive Species	<input checked="" type="checkbox"/>
Bank Erosion	<input type="checkbox"/>	Ponded Conditions	<input type="checkbox"/>
Slumping	<input type="checkbox"/>	Subsidence	<input type="checkbox"/>

Structure / Channel:

Overall Condition:

Life Expectancy (Years):

Road Condition:

Structure Type:

Structure Age (Years):

Structure 1 Width (Feet):

Structure 1 Length (Feet):

Structure 2 Width (Feet):

Structure 2 Length (Feet):

Skew (Degrees):

Cover (Feet):

Scour Protection: ☐

Adequately Aligned: ☒

Headwall Type:

Headwall Condition:

Ecological Integrity / Habitat Value

Surrounding Land Use %

Commercial / Industrial	<input type="text" value="0"/>
Residential	<input type="text" value="50"/>
Agricultural	<input type="text" value="0"/>
Undeveloped	<input type="text" value="50"/>

Severity of Impairment(s):

Invasive Plant Cover:

Extent of Wooded Buffer:

Habitat Connectivity:

NHESP Estimated Habitats of Rare Wildlife: ☐

NHESP Priority Habitats of Rare Species: ☐

NHESP BioMap Core Habitat: ☒

NHESP BioMap Supporting Natural Landscape: ☐

ACEC: ☐

Anadromous Fish: ☐

Shellfishing Suitability: ☒

Barriers to Fish Passage:



Construction Logistics / Feasibility

Traffic Volume	<input type="text" value="Low"/>
Detour Potential	<input type="checkbox"/>
Site Access	<input type="text" value="Fair"/>
Staging Areas	<input checked="" type="checkbox"/>
Fill Material Concern	<input type="text" value="Minimal"/>
Low Lying Property Concerns	<input type="text" value="Minimal"/>
Overhead Utility Constraint	<input type="text" value="Moderate"/>
Underground Utilities	
Water <input checked="" type="checkbox"/>	Telephone <input type="checkbox"/>
Gas <input type="checkbox"/>	Sewer <input type="checkbox"/>
Electric <input type="checkbox"/>	Drainage <input type="checkbox"/>
Permitting Complexity	<input type="text" value="Medium"/>
Local Support	<input type="text" value="Unknown"/>
Feasibility Cost	<input type="text" value="25,000"/>
Design Cost	<input type="text" value="40,000"/>
Permitting Cost	<input type="text" value="25,000"/>
Construction Cost	<input type="text" value="550,000"/>
Total Cost	<input type="text" value="640,000"/>
Relative Cost/Acre	<input type="text" value="246,000"/>

Socioeconomic

Recreation	Education
Public Access: <input type="checkbox"/>	Schools Nearby: <input type="checkbox"/>
Watercraft / Portage: <input type="checkbox"/>	Ongoing Research: <input type="checkbox"/>
Wildlife Viewing: <input type="checkbox"/>	Education / Outreach Potential: <input type="text" value="Low"/>
	Safety Concerns (Access): <input type="text" value="Low"/>
Uniqueness / Heritage Value	
Rare Species Habitat: <input type="checkbox"/>	
ACEC: <input type="checkbox"/>	
Cultural Resource Features <input type="checkbox"/>	
Urban Viewscape Value: <input type="text" value="None"/>	
Urban Habitat Value: <input type="text" value="None"/>	

Tide Surveys

	<i>Start:</i>		<i>Finish:</i>
Dates of 1st Survey:	<input type="text"/>	-	<input type="text"/>
Date of Highest Tide:	<input type="text"/>		
Max Measured Tidal Dampening:	<input type="text"/>		
Percent of Tidal Prism:	<input type="text"/>		
Measured Delay:	<input type="text"/>		
	<i>Start:</i>		<i>Finish:</i>
Dates of 2nd Survey:	<input type="text"/>	-	<input type="text"/>
Date of Highest Tide:	<input type="text"/>		
Max Measured Tidal Dampening:	<input type="text"/>		
Percent of Tidal Prism:	<input type="text"/>		
Measured Delay:	<input type="text"/>		

Summary

Uniqueness / Heritage Value:	<input type="text" value="Low"/>	Ecological Integrity:	<input type="text" value="Low"/>
Recreational Value:	<input type="text" value="Low"/>	Logistics / Feasibility:	<input type="text" value="Medium"/>
Educational Value:	<input type="text" value="Low"/>		
Restoration Potential:			<input type="text" value="Moderate"/>